1. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$3 - 2i \text{ and } -3$$

A. $b \in [1.1, 4], c \in [-5.1, -3.6],$ and $d \in [-40, -32]$

B. $b \in [-0.4, 2], c \in [-2.9, 0.1],$ and $d \in [-9, -4]$

C. $b \in [-0.4, 2], c \in [3.2, 8.7],$ and $d \in [4, 7]$

D. $b \in [-6.7, -1], c \in [-5.1, -3.6],$ and $d \in [36, 41]$

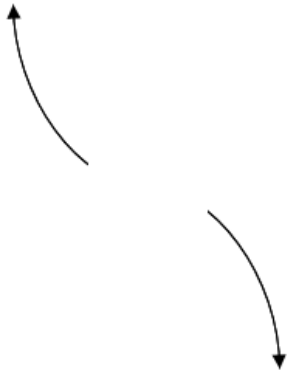
E. None of the above.

---

2. Describe the end behavior of the polynomial below.

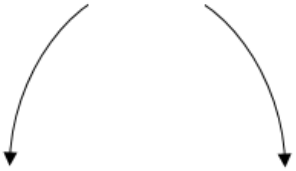
$$f(x) = 2(x-9)^3(x+9)^8(x-7)^3(x+7)^5$$

A.

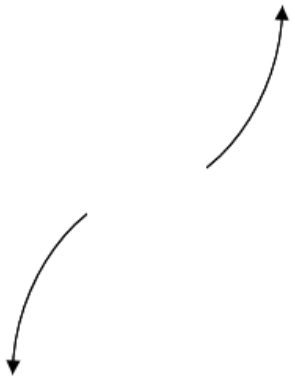


C.

B.



D.



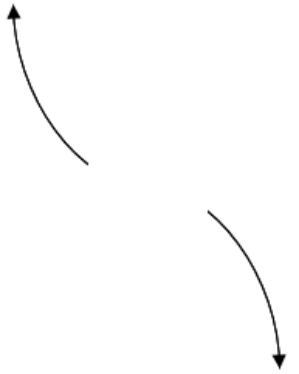
E. None of the above.

---

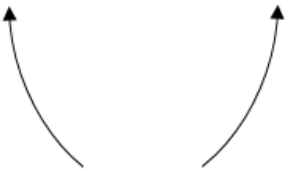
3. Describe the end behavior of the polynomial below.

$$f(x) = -4(x-2)^5(x+2)^{10}(x-3)^5(x+3)^6$$

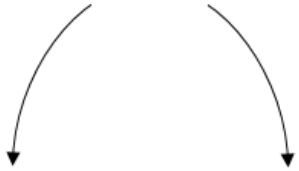
A.



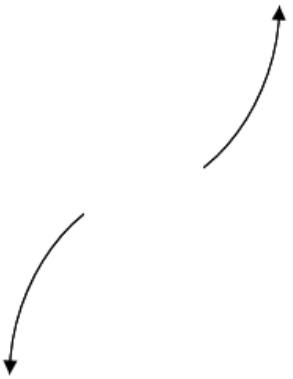
C.



B.



D.



E. None of the above.

---

4. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$-6, \frac{-3}{4}, \text{ and } \frac{7}{2}$$

A. $a \in [3, 10], b \in [-75, -66], c \in [108, 118],$ and $d \in [125, 128]$

B. $a \in [3, 10], b \in [-26, -24], c \in [-154, -145],$ and $d \in [125, 128]$

C. $a \in [3, 10], b \in [23, 33], c \in [-154, -145],$ and $d \in [-130, -119]$

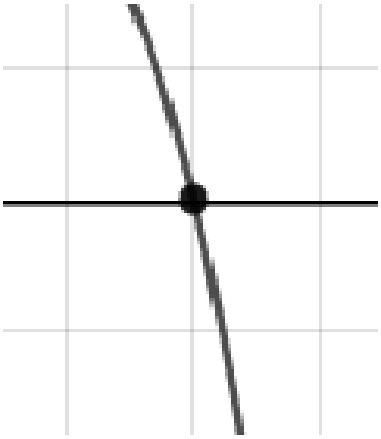
D. $a \in [3, 10], b \in [-89, -77], c \in [222, 233],$ and $d \in [-130, -119]$

E. $a \in [3, 10], b \in [23, 33], c \in [-154, -145],$ and $d \in [125, 128]$

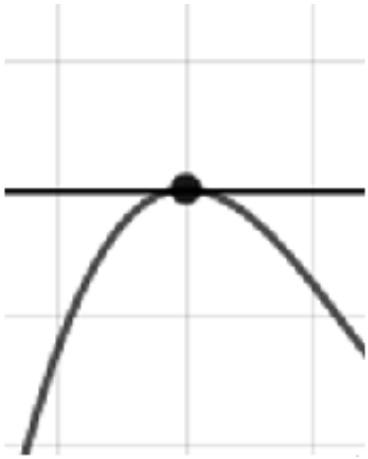
---

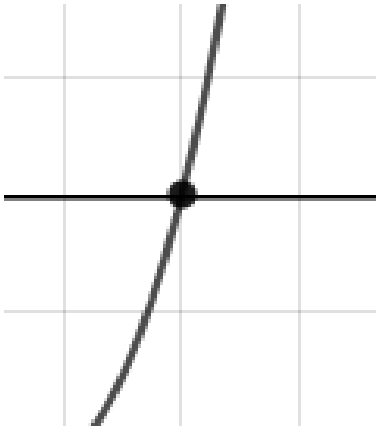
5. Describe the zero behavior of the zero $x = 3$ of the polynomial below.

$$f(x) = 6(x-3)^4(x+3)^9(x+7)^4(x-7)^8$$

A. 

C. 

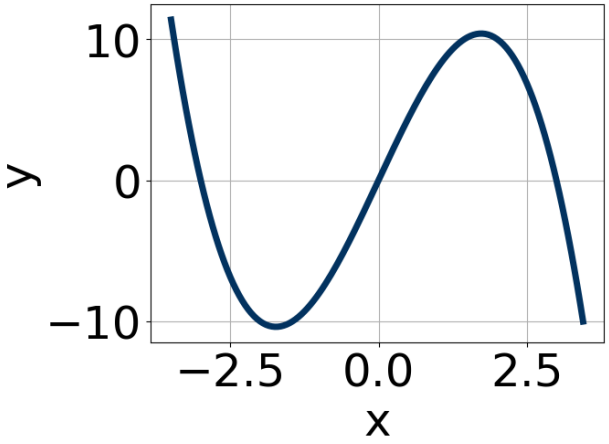
B. 

D. 

E. None of the above.

---

6. Which of the following equations *could* be of the graph presented below?



A. $5x^5(x-3)^{10}(x+3)^5$

B. $-7x^9(x-3)^4(x+3)^9$

C. $-14x^{11}(x-3)^5(x+3)^9$

D. $-18x^9(x-3)^4(x+3)^8$

E. $17x^7(x-3)^5(x+3)^5$

---

7. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form x^3+bx^2+cx+d.

$$-2-5i \text{ and } 3$$

A. $b \in [0.2, 3.8], c \in [16.8, 19.7],$ and $d \in [-92, -81]$

B. $b \in [0.2, 3.8], c \in [-3.5, 0.3],$ and $d \in [-9, -3]$

C. $b \in [-4.5, 0.5], c \in [16.8, 19.7],$ and $d \in [86, 92]$

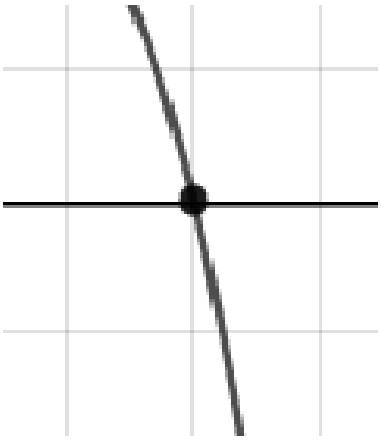
D. $b \in [0.2, 3.8], c \in [1.8, 4.3],$ and $d \in [-18, -11]$

E. None of the above.

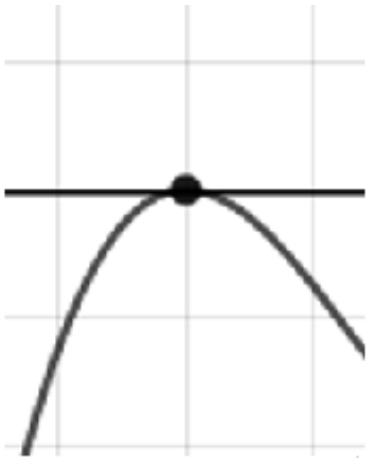
---

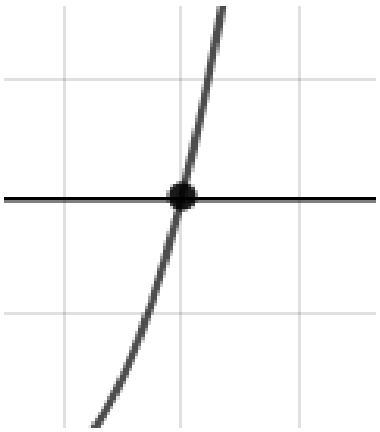
8. Describe the zero behavior of the zero $x=5$ of the polynomial below.

$$f(x) = -9(x-6)^{11}(x+6)^9(x-5)^7(x+5)^6$$

A. 

C. 

B. 

D. 

E. None of the above.

---

9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{5}{3}, 7, \text{ and } \frac{-7}{5}$$

A. $a \in [13, 24], b \in [143, 153], c \in [348, 358],$ and $d \in [239, 253]$

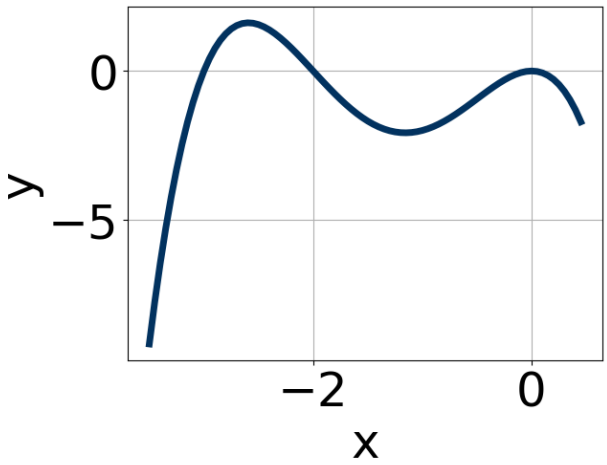
B. $a \in [13, 24], b \in [-110, -101], c \in [-10, -4],$ and $d \in [239, 253]$

C. $a \in [13, 24], b \in [-110, -101], c \in [-10, -4],$ and $d \in [-247, -238]$

D. $a \in [13, 24], b \in [106, 114], c \in [-10, -4],$ and $d \in [-247, -238]$

E. $a \in [13, 24], b \in [-60, -56], c \in [-287, -277],$ and $d \in [-247, -238]$

10. Which of the following equations *could* be of the graph presented below?



A. $9x^4(x+3)^7(x+2)^{11}$

B. $-20x^{10}(x+3)^{10}(x+2)^{11}$

C. $14x^4(x+3)^9(x+2)^8$

D. $-13x^9(x+3)^6(x+2)^9$

E. $-18x^6(x+3)^{11}(x+2)^9$

11. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$5 - 3i \text{ and } 2$$

A. $b \in [-9, 6], c \in [0, 6],$ and $d \in [-9, 1]$

B. $b \in [10, 13], c \in [52, 62],$ and $d \in [68, 76]$

C. $b \in [-14, -11], c \in [52, 62],$ and $d \in [-76, -62]$

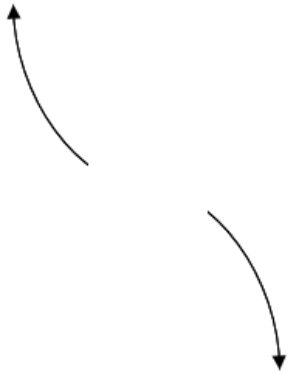
D. $b \in [-9, 6], c \in [-13, -1],$ and $d \in [4, 16]$

E. None of the above.

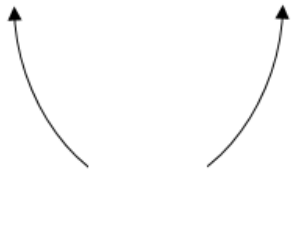
12. Describe the end behavior of the polynomial below.

$$f(x) = 8(x+3)^3(x-3)^8(x-2)^3(x+2)^4$$

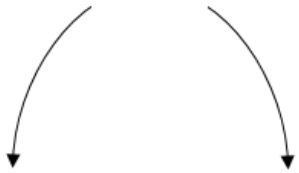
A.



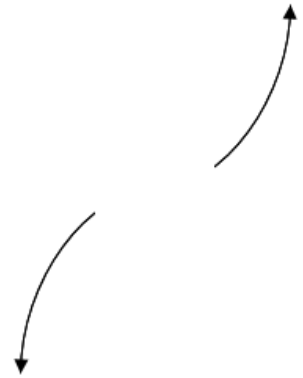
C.



B.



D.



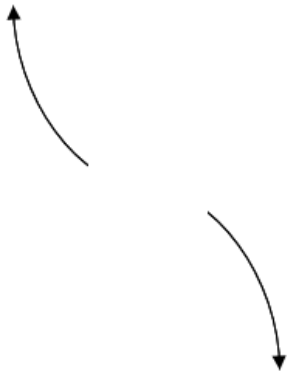
E. None of the above.

---

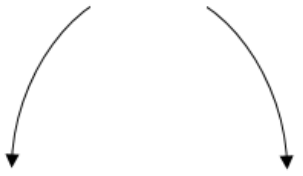
13. Describe the end behavior of the polynomial below.

$$f(x) = 7(x-4)^4(x+4)^5(x+3)^3(x-3)^5$$

A.

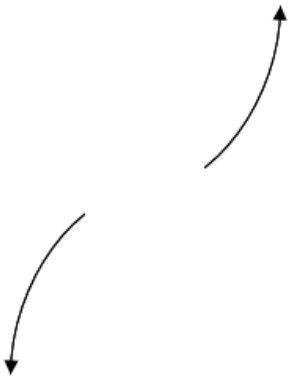


B.



C.

D.



E. None of the above.

---

14. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$7, \frac{-1}{5}, \text{ and } \frac{2}{3}$$

A. $a \in [15, 17], b \in [110.6, 112.3], c \in [44, 57],$ and $d \in [-17, -12]$

B. $a \in [15, 17], b \in [91.8, 95.9], c \in [-92, -82],$ and $d \in [14, 19]$

C. $a \in [15, 17], b \in [-112.5, -108.4], c \in [44, 57],$ and $d \in [14, 19]$

D. $a \in [15, 17], b \in [96, 100.8], c \in [-52, -44],$ and $d \in [-17, -12]$

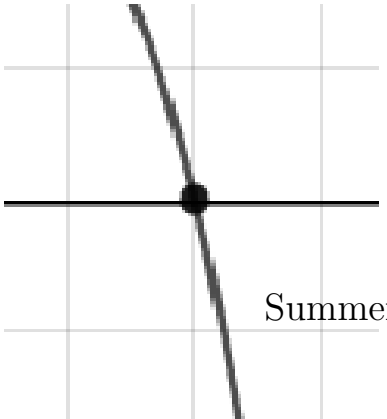
E. $a \in [15, 17], b \in [-112.5, -108.4], c \in [44, 57],$ and $d \in [-17, -12]$

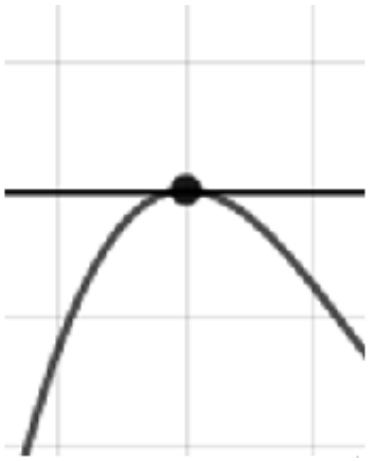
---

15. Describe the zero behavior of the zero $x = 2$ of the polynomial below.

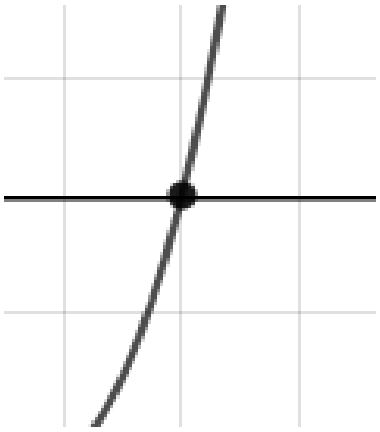
$$f(x) = -3(x + 2)^4(x - 2)^5(x - 7)^5(x + 7)^7$$

A.



B. 

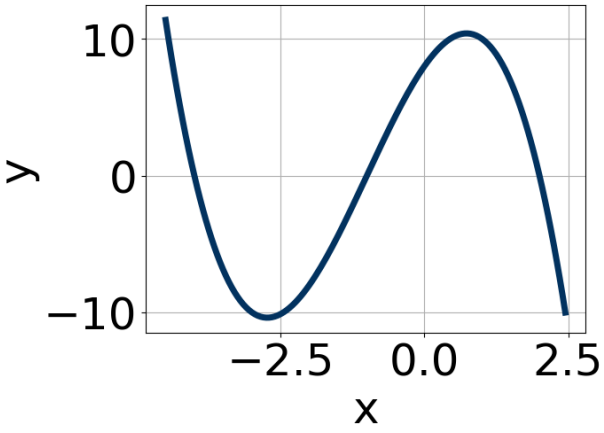
C. 

D. 

E. None of the above.

---

16. Which of the following equations *could* be of the graph presented below?



A. $-8(x-2)^{10}(x+4)^{6}(x+1)^{5}$

B. $12(x-2)^{8}(x+4)^{7}(x+1)^{7}$

C. $-4(x-2)^{10}(x+4)^{11}(x+1)^{11}$

D. $11(x-2)^{7}(x+4)^{9}(x+1)^{9}$

E. $-10(x-2)^{5}(x+4)^{7}(x+1)^{11}$

---

17. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$4 + 5i \text{ and } 1$$

A. $b \in [-11, -5], c \in [48.79, 49.11],$ and $d \in [-41.09, -39.64]$

B. $b \in [1, 6], c \in [-5.16, -3.28],$ and $d \in [2.13, 4.62]$

C. $b \in [1, 6], c \in [-6.36, -5.54],$ and $d \in [4.44, 5.18]$

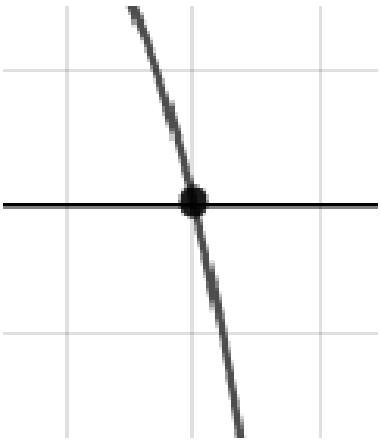
D. $b \in [3, 14], c \in [48.79, 49.11],$ and $d \in [39.48, 43]$

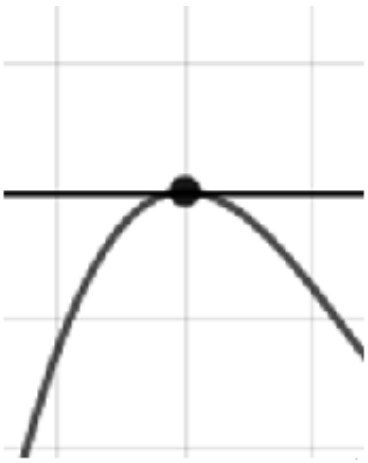
E. None of the above.

---

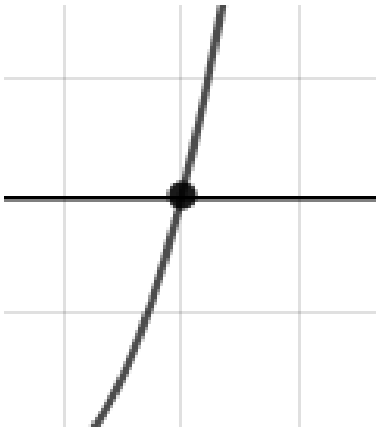
18. Describe the zero behavior of the zero $x = -7$ of the polynomial below.

$$f(x) = -9(x-4)^5(x+4)^2(x+7)^{11}(x-7)^8$$

A. 

B. 

C. 

D. 

E. None of the above.

---

19. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$-1, \frac{-4}{5}, \text{ and } \frac{3}{5}$$

A. $a \in [19, 32], b \in [28, 33], c \in [-10, -3],$ and $d \in [12, 19]$

B. $a \in [19, 32], b \in [-26, -18], c \in [-20, -16],$ and $d \in [12, 19]$

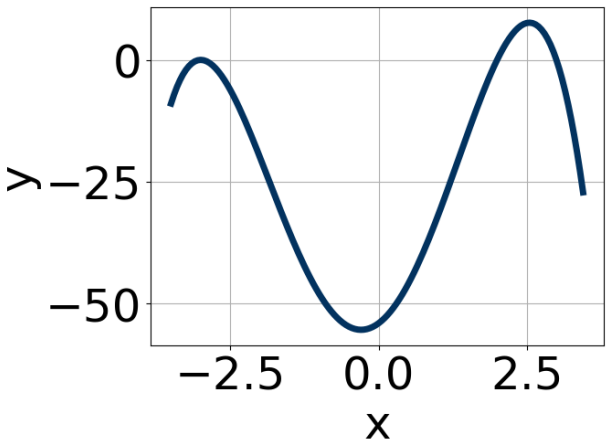
C. $a \in [19, 32], b \in [-64, -56], c \in [45, 49],$ and $d \in [-12, -9]$

D. $a \in [19, 32], b \in [28, 33], c \in [-10, -3],$ and $d \in [-12, -9]$

E. $a \in [19, 32], b \in [-32, -26], c \in [-10, -3],$ and $d \in [12, 19]$

---

20. Which of the following equations *could* be of the graph presented below?



A. $12(x+3)^8(x-2)^{11}(x-3)^9$

B. $-19(x+3)^6(x-2)^{10}(x-3)^{11}$

C. $-20(x+3)^9(x-2)^6(x-3)^9$

D. $6(x+3)^4(x-2)^{11}(x-3)^4$

E. $-5(x+3)^6(x-2)^5(x-3)^9$

---

21. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$5 + 2i \text{ and } 1$$

A. $b \in [-18, -7], c \in [35.4, 40.7],$ and $d \in [-30.8, -28.8]$

B. $b \in [-6, 7], c \in [-10.4, -5.5],$ and $d \in [2.6, 6.3]$

C. $b \in [-6, 7], c \in [-4.6, -2.6],$ and $d \in [-4.2, 2.7]$

D. $b \in [10, 12], c \in [35.4, 40.7],$ and $d \in [24.9, 29.1]$

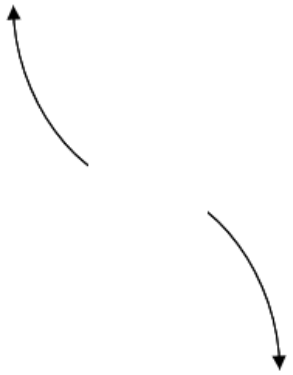
E. None of the above.

---

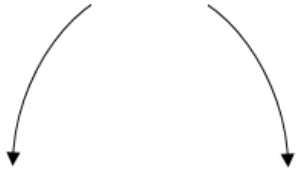
22. Describe the end behavior of the polynomial below.

$$f(x) = 7(x-4)^3(x+4)^4(x-8)^2(x+8)^2$$

A.

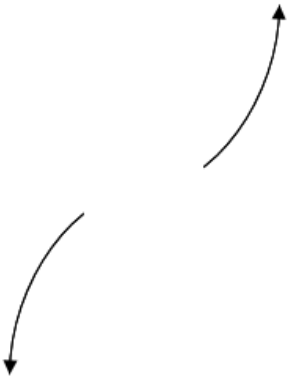


B.



C.

D.



E. None of the above.

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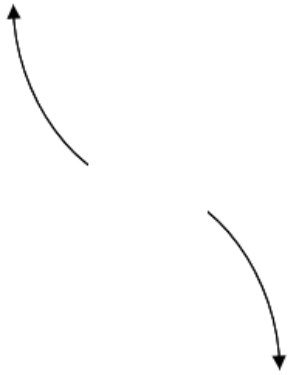
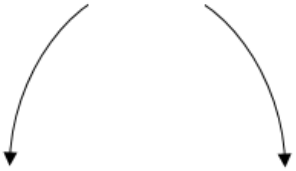
23. Describe the end behavior of the polynomial below.

$$f(x) = 4(x+3)^2(x-3)^7(x+8)^5(x-8)^6$$

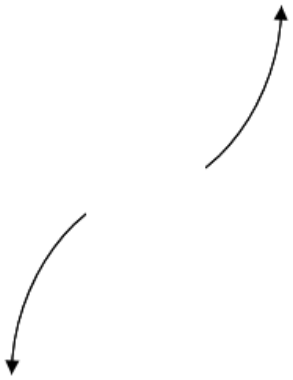
A.



B.



C.

D. 

E. None of the above.

---

24. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-3}{4}, -7, \text{ and } \frac{-1}{3}$$

A. $a \in [12, 14], b \in [94, 98], c \in [90, 105],$ and $d \in [20, 26]$

B. $a \in [12, 14], b \in [-99, -94], c \in [90, 105],$ and $d \in [-26, -20]$

C. $a \in [12, 14], b \in [-93, -88], c \in [31, 33],$ and $d \in [20, 26]$

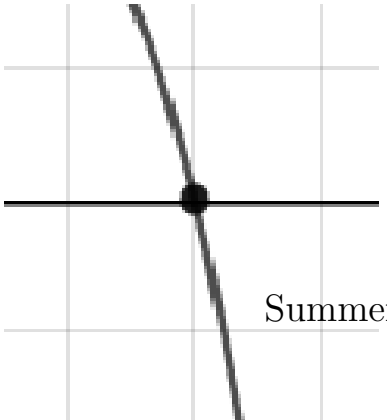
D. $a \in [12, 14], b \in [78, 86], c \in [-43, -37],$ and $d \in [-26, -20]$

E. $a \in [12, 14], b \in [94, 98], c \in [90, 105],$ and $d \in [-26, -20]$

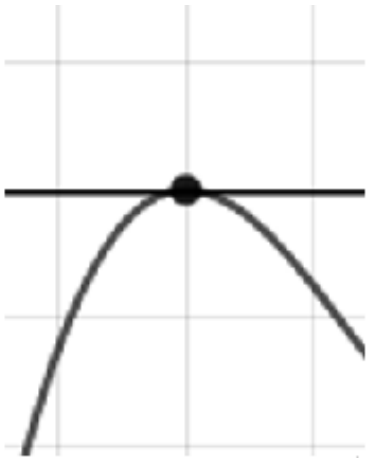
---

25. Describe the zero behavior of the zero $x = -9$ of the polynomial below.

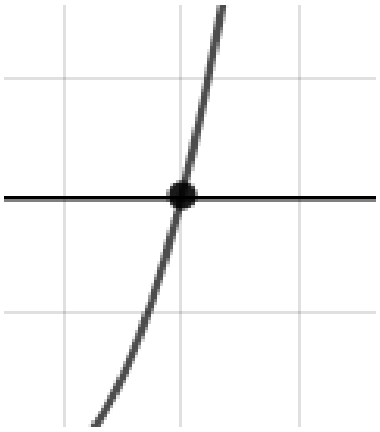
$$f(x) = 2(x-4)^{10}(x+4)^6(x+9)^{10}(x-9)^7$$



A

B. 

C. 

D. 

E. None of the above.

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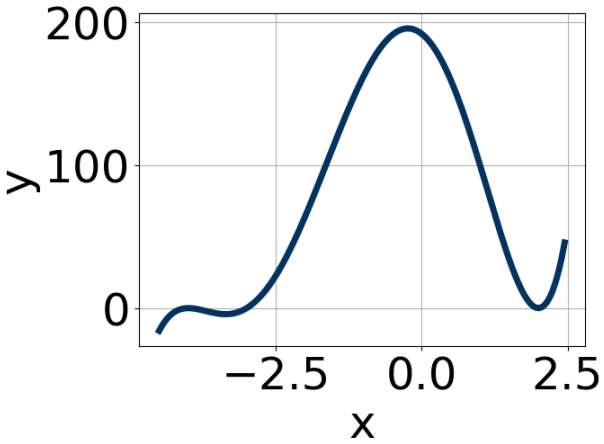
26. Which of the following equations *could* be of the graph presented below?



A. $15(x+4)^6(x-2)^7(x+3)^5$

B. $-6(x+4)^{10}(x-2)^{6}(x+3)^{8}$

C. $17(x+4)^{10}(x-2)^{7}(x+3)^{10}$

D. $-19(x+4)^{8}(x-2)^{8}(x+3)^{7}$

E. $6(x+4)^{4}(x-2)^{8}(x+3)^{7}$

---

27. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$2 + 3i \text{ and } 1$$

A. $b \in [-1.8, 1.9], c \in [-4.15, -3.21],$ and $d \in [2.99, 3.53]$

B. $b \in [-9.1, -3.5], c \in [16.78, 18.65],$ and $d \in [-14.03, -11.89]$

C. $b \in [4.7, 5.3], c \in [16.78, 18.65],$ and $d \in [11.64, 13.41]$

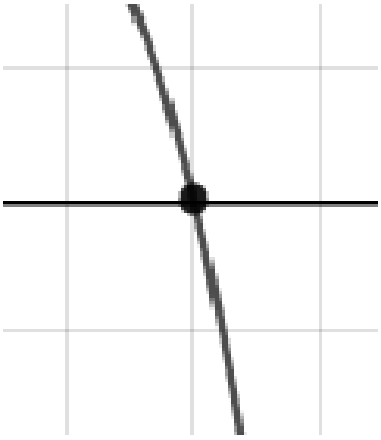
D. $b \in [-1.8, 1.9], c \in [-3.38, -1.37],$ and $d \in [1.75, 2.85]$

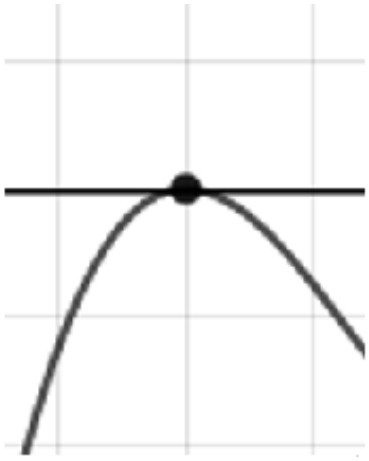
E. None of the above.

---

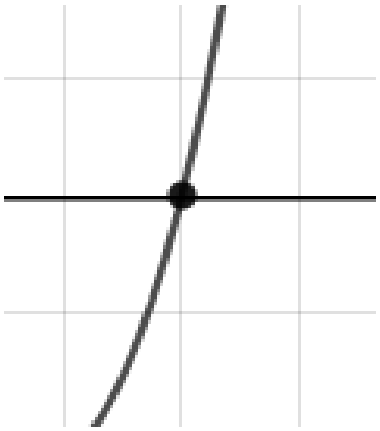
28. Describe the zero behavior of the zero $x = -4$ of the polynomial below.

$$f(x) = 6(x-4)^{7}(x+4)^{12}(x+3)^{4}(x-3)^{6}$$

A. 

B. 

C. 

D. 

E. None of the above.

---

29. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{1}{2}, \frac{5}{4}, \text{ and } \frac{-1}{5}$$

A. $a \in [37, 43], b \in [-63, -59], c \in [10, 12],$ and $d \in [4, 9]$

B. $a \in [37, 43], b \in [-24, -15], c \in [-38, -26],$ and $d \in [-12, -4]$

C. $a \in [37, 43], b \in [-63, -59], c \in [10, 12],$ and $d \in [-12, -4]$

D. $a \in [37, 43], b \in [74, 85], c \in [38, 41],$ and $d \in [4, 9]$

E. $a \in [37, 43], b \in [55, 66], c \in [10, 12],$ and $d \in [-12, -4]$

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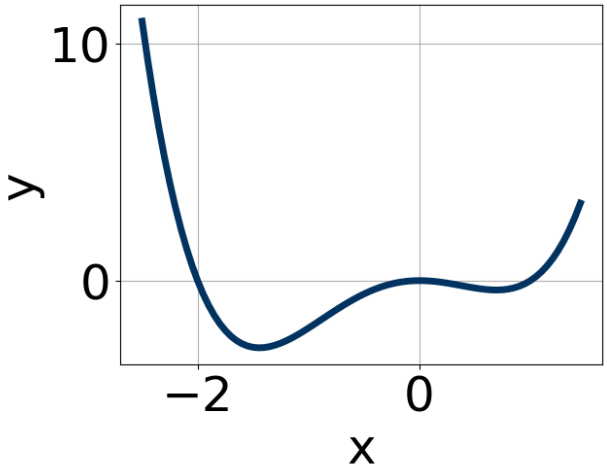
30. Which of the following equations *could* be of the graph presented below?



A. $-2x^8(x-1)^5(x+2)^7$

B. $13x^9(x-1)^4(x+2)^9$

C. $-14x^8(x-1)^7(x+2)^{10}$

D. $4x^4(x-1)^{11}(x+2)^{11}$

E. $7x^8(x-1)^6(x+2)^7$
